

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An ATM node apparatus which has a VC set between at least two adjacent ATM node apparatuses and transfers a packet over the VC after dividing the packet into cells, ~~characterized by~~ comprising:

a route table, a quality description table, a plurality of output queues, and an output control section for performing read control on a packet from each output queue so as to achieve a quality set for each output queue, wherein an output destination of an incoming packet is determined by searching said route table by using packet header information, ~~which is not included in ATM header information, but included in a start cell of the packet,~~ a quality class of the packet is determined by searching said quality description table, the packet is stored in an output queue determined by the determined output destination and quality class, and the packet is read out from said output queue in accordance with the quality set for said output queue.

2. (canceled)

3. (currently amended) An ATM node apparatus which has a VC set between ATM node apparatuses and configured to transfer a packet over the VC after dividing the packet into cells, ~~characterized by~~ comprising:

a route table and a quality description table, wherein an output destination of an incoming packet is determined by searching said route table by using packet header information, ~~which is not included in ATM header information, but included in a start cell of the packet~~, a quality class of the packet is determined by searching said quality description table, the packet is sent out through a VC determined by the determined output destination and quality class, and a plurality of VCs with different qualities are set for the same output destination.

4. (original) A node apparatus according to claim 1, characterized in that said quality description table has at least a virtual dedicated network number field, a destination address/mask length field, a source address/mask length field, a fourth-layer protocol/source port number field, and a destination port number field, and specific values are written in the respective fields or a blank field is formed to match any value.

5. (original) A node apparatus according to claim 3, characterized in that said quality description table has at least a virtual dedicated network number field, a destination address/mask length field, a source address/mask length field, a fourth-layer protocol/source port number field, and a destination port number field, and specific values are written in the respective fields or a blank field is formed to match any value.

6. (original) A node apparatus according to claim 4, characterized in that each entry of said quality description table has a priority, any entry in which all fields

other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry having the highest priority is selected from the selected entries.

7. (original) A node apparatus according to claim 5, characterized in that each entry of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry having the highest priority is selected from the selected entries.

8. (original) A node apparatus according to claim 4, characterized in that each field of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry in which a match is obtained in a field with a higher priority is selected from the selected entries.

9. (original) A node apparatus according to claim 5, characterized in that each field of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries

are selected, an entry in which a match is obtained in a field with a higher priority is selected from the selected entries.

10. (original) A node apparatus according to claim 4, characterized in that said route table and said quality description table have entries in units of virtual dedicated networks, a virtual dedicated network to which a packet belongs is specified from a VC through which the packet has arrived, and an output queue for storing the packet or an output VC to which the packet is output is determined by using entries of said route table and quality description table for the specified virtual dedicated network.

11. (original) A node apparatus according to claim 5, characterized in that said route table and said quality description table have entries in units of virtual dedicated networks, a virtual dedicated network to which a packet belongs is specified from a VC through which the packet has arrived, and an output queue for storing the packet or an output VC to which the packet is output is determined by using entries of said route table and quality description table for the specified virtual dedicated network.

12. (currently amended) A node apparatus which has a plurality of VCs with different qualities set between said node apparatus and another adjacent node apparatus and transfers a packet over the VC, ~~characterized by comprising:~~

a plurality of output queues for which predetermined qualities are respectively set;

a route table in which in correspondence with a destination address, an output destination of a packet having the destination address is defined;

a quality description table in which in correspondence with predetermined information in a packet header, a quality class of the packet having the information in the packet header is defined;

an output table in which in correspondence with a pair of an output destination of a packet and a quality class, an output queue in which the packet should be stored and an output VC to which the packet in said output queue should be output are defined;

a header processing section for determining an output destination of an incoming packet by searching said route table by using [[an]] a destination address in a header of the packet, determining a quality class of the packet by searching said quality table by using the predetermined information in the header, determining an output queue in which the packet is to be stored and an output VC by searching said output table by using a pair of the determined output destination of the packet and the determined quality class, and storing the incoming packet in said determined output queue; and

an output control section for reading out a packet from each of said output queues so as to achieve a quality set for each of said output queues, and outputting the packet to the determined output VC.

13. (currently amended) A node apparatus which has a plurality of VCs with different qualities set between said node apparatus and another adjacent node apparatus and transfers a packet over the VC, ~~characterized by~~ comprising:

a plurality of output queues for which predetermined qualities are respectively set;
an output table in which in correspondence with a destination address of a packet and a predetermined type of information in a packet header, an output queue in which a packet having the destination address and the predetermined information are to be stored and an output VC to which the packet in said output queue is to be output are defined;
a header processing section for determining an output queue in which the packet is stored and an output VC by searching said output table by using the destination address and the predetermined information in a header of an incoming packet; and
an output control section for reading out a packet from each of said output queues so as to achieve a quality set for each of said output queues, and outputting the packet to the determined output VC.

14. (currently amended) A node apparatus which has a plurality of VCs with different qualities set between said node apparatus and another adjacent node apparatus and transfers a packet over the VC upon segmenting the packet into cells, characterized by comprising:

a plurality of output queues for which predetermined qualities are respectively set;
a packet queue for each input VC;
a ~~route~~ route table in which in correspondence with a destination address, an output destination of a packet having the destination address is defined;

a quality description table in which in correspondence with predetermined information in a packet header, a quality class of the packet having the information in the packet header is defined;

an output table in which in correspondence with a pair of an output destination of a packet and a quality class, an output queue in which the packet is to be stored and an output VC to which the packet in said output queue is to be output are defined;

a header processing section for, when a start cell of a packet arrives, determining an output destination of the packet by searching said route table by using a destination address in a packet header contained in the start cell, determining a quality class of the packet by searching said quality table by using the predetermined information in the header, determining an output queue in which the packet is stored and an output VC by searching said output table by using a pair of the determined output destination of the packet and the determined quality class, and storing the start cell in said packet queue corresponding to an input VC, and for, when a cell other than the start cell of the packet arrives, storing the incoming cell in said packet queue corresponding to an input VC, and simultaneously moving all cells constituting the packet stored in said packet queue to said determined output queue when a final cell of the packet is stored; and

an output control section for reading out a cell of a packet from each of said output queues so as to achieve a quality set for each of said output queues and outputting the cell to the determined output VC.

15. (currently amended) A quality guarantee node apparatus which has a plurality of VCs with different qualities set between said node apparatus and another adjacent node apparatus and transfers a packet over the VC upon segmenting the packet into cells, ~~characterized by~~ comprising:

a plurality of input buffer sections, a plurality of output buffer sections, and a cell step section for transferring a cell of a packet output from an arbitrary input buffer section to an arbitrary output buffer section,

- a. each of said input buffer sections including
 - first output queues for which predetermined qualities are respectively set and which are prepared for the respective output VCs of said node apparatus,
 - a first packet queue for each input VC,
 - a ~~route~~ route table in which in correspondence with a destination address, an output destination of a packet having the destination address is defined,
 - a quality description table in which in correspondence with predetermined information in a packet header, a quality class of the packet having the information in the packet header is defined,
 - an output table in which in correspondence with a pair of an output destination of a packet and a quality class, a first output queue in which the packet is to be stored and an output VC to which the packet in said first output queue is to be output are defined,
 - a header processing section for, when a start cell of a packet arrives, determining an output destination of the packet by searching said route table by using a

destination address in a packet header contained in the start cell, determining a quality class of the packet by searching said quality table by using the predetermined information in the header, determining a first output queue in which the packet is stored and an output VC by searching said output table by using a pair of the determined output destination of the packet and the determined quality class, and storing the start cell in said first packet queue corresponding to an input VC, and for, when a cell other than the start cell of the packet arrives, storing the incoming cell in said first packet queue corresponding to an input VC, and simultaneously moving all cells constituting the packet stored in said first packet queue to said determined first output queue when a final cell of the packet is stored, and

a first output control section for reading out a cell of a packet from each of said first output queues so as to achieve a quality set for each of said first output queues, and outputting the cell to an output buffer section having the determined output VC via said cell switch section, and

- b. each of said output buffer sections including
- second packet queues prepared to be equal in number to said input buffer sections for the respective output VCs of said output buffer section,
- a second output queue which is prepared for each output VC of said output buffer section and for which the sum of qualities set for output queues of said input buffer section which correspond to the output VC is set,
- a second header processing section for, when a cell is input from said cell switch section, storing the cell in said second packet queue corresponding to said input

buffer section as a source of the cell and an output VC, and simultaneously moving all cells stored in said second packet queue to said second output queue corresponding to the output VC after a final cell of the packet is stored, and

a second output control section for reading out a cell of a packet from each of said second output queues so as to achieve a quality set for each of said second output queues and outputting the cell to the determined output VC.

16. (original) A node apparatus according to claim 14, characterized in that said node apparatus comprises an ATM switch capable of performing quality control on each output queue, and a quality guarantee on a packet level, is performed by using a cell-level quality guarantee mechanism of said ATM switch.

17. (original) A node apparatus according to claim 15, characterized in that said node apparatus comprises an ATM switch capable of performing quality control on each output queue, and a quality guarantee on a packet level is performed by using a cell-level quality guarantee mechanism of said ATM switch.

18. (currently amended) A node apparatus according to claim 12, characterized in that said quality description table has at least two of a virtual dedicated network number field, a destination address/mask length field, a source address/mask length field, a fourth-layer protocol/source port number field, [[and]] or a destination port

number field, and specific values are written in the respective fields or a blank field is formed to match any value.

19. (currently amended) A node apparatus according to claim 14, characterized in that said quality description table has at least two of a virtual dedicated network number field, a destination address/mask length field, a source address/mask length field, a fourth-layer protocol/source port number field, and a destination port number field, [[and]] or specific values are written in the respective fields or a blank field is formed to match any value.

20. (currently amended) A node apparatus according to claim 15, characterized in that said quality description table has at least two of a virtual dedicated network number field, a destination address/mask length field, a source address/mask length field, a fourth-layer protocol/source port number field, [[and]] or a destination port number field, [[and]] specific values are written in the respective fields or a blank field is formed to match any value.

21. (original) A node apparatus according to claim 18, characterized in that each entry of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry having the highest priority is selected from the selected entries.

22. (original) A node apparatus according to claim 19, characterized in that each entry of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry having the highest priority is selected from the selected entries.

23. (original) A node apparatus according to claim 20, characterized in that each entry of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry having the highest priority is selected from the selected entries.

24. (original) A node apparatus according to claim 18, characterized in that each field of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry in which a match is obtained in a field with a higher priority is selected from the selected entries.

25. (original) A node apparatus according to claim 19, characterized in that each field of said quality description table has a priority, any entry in which all fields

other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry in which a match is obtained in a field with a higher priority is selected from the selected entries.

26. (original) A node apparatus according to claim 20, characterized in that each field of said quality description table has a priority, any entry in which all fields other than a blank field match an incoming packet is selected from said quality description table in searching said quality description table, and if a plurality of entries are selected, an entry in which a match is obtained in a field with a higher priority is selected from the selected entries.

27-76. (canceled)

77. (new) A method comprising:

- receiving a packet as a plurality of cells;
- determining an output destination using a first portion of a header of the packet;
- determining a quality class for the packet using a second portion of the header of the packet; and
- storing the packet in an output queue based on the output destination and the quality class.

78. (new) The method of claim 77 further comprising:
transmitting the packet via a virtual channel (VC) in accordance with the
quality class.
79. (new) The method of claim 77 wherein the first portion of the header
includes a destination address.
80. (new) The method of claim 79 wherein the second portion of the header
includes a destination address, a destination port number, a source address, and a source
port number.
81. (new) The method of claim 77 wherein the determining an output
destination includes:
using the first portion of the header to look up the output destination from
a route table.
82. (new) The method of claim 81 wherein the determining a quality class
includes:
using the second portion of the header to look up the quality class from a
quality description table.
83. (new) A network device comprising:

a plurality of output queues;
a route table configured to store output destinations;
a quality description table configured to store quality classes;
an output table configured to store output queue numbers and output
virtual channel (VC) numbers; and
a processing unit configured to:
 receive a packet as a plurality of cells,
 identify an output destination for the packet using a first portion of
a header of the packet,
 identify a quality class for the packet using a second portion of the
header of the packet, and
 use the identified output destination and the identified quality class
to identify one of the plurality of output queues in which to store the packet and a VC
number associated with a VC via which the packet is to be transmitted.

84. (new) The network device of claim 83 further comprising:
an output control section configured to:
 read the packet from the identified one output queue, and
 transmit the packet via the VC in accordance with the identified
quality class.

85. (new) The network device of claim 83 wherein the first portion of the header includes a destination address.

86. (new) The network device of claim 85 wherein the second portion of the header includes a destination address, a destination port number, a source address, and a source port number.